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LEANNE MYNOTT
MANAGER EXAMINATION SUPPORT
AND SALES

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PROVISIONAL PATENT
APPLICATION

LIGHTWEIGHT HELMET DETACHABLE EAR PROTECTOR AND AUDIO SYSTEM

This invention relates to a completely new and innovative ear protection and audio system that can be easily attached or removed from a lightweight helmet.

The idea of detachable ear protection, or ear flaps, for lightweight sports helmets with shells cut above the ears is not new; particularly for snow sports, where they are a feature of many designs currently available on today's market.

The purpose of fitting a lightweight helmet with detachable ear flaps has primarily been to give the wearer the option to choose whether or not to cover the ears for protection from the elements. Perforations, or simple vents, are sometimes added to the ear flaps to allow for improved hearing when worn. Known designs are made from flexible materials or foams and are usually attached to the helmet by means of press studs, or clips, forming an extension of the helmet liner. The ear flaps are usually positioned on the inside of, and operate independently from, the helmet chinstrap, although they may share the same connection points and utilize the same components for attachment.

Ear flaps currently used on lightweight helmets have functional limitations because of their soft, flexible, structure and they are known to have fitting and stability problems that can compromise the level of protection and comfort they provide to the ears. Some can press against the ears, to the extent that they are uncomfortable and restrict hearing, Often they are prone to disconnect or come away too easily, shifting or falling completely off the helmet exposing the ears and side of the face.

For some time now, communications and visual devices have been attached by rudimentary means to helmets. Safety rescue, water patrol, sporting and other industries have identified the need for better methods of attaching these devices, without the requirement to modify the helmet, thereby enabling easier and more efficient utilization of the latest technological developments. Ear flaps made of soft foam or similar material are limited in their application as a suitable platform and are not currently designed to facilitate this need.

The new detachable ear protector and audio system incorporates novel features that overcome the limitations of current helmet ear flaps. When fitted to a lightweight helmet the combination gives a more versatile helmet that is suitable for a wider range of sport and industry applications because it is designed to perform as an extension of the helmet shell to cover and protect the ears AND provide a method of attachment for communications and other devices. Whilst communications have previously only been achievable with the addition of bulky headsets or similar apparatus, the new design offers a method of attachment and speaker housing that retains a compact, close fitting helmet profile.

The rigid plastic outer cover of the new detachable system gives an increased level of safety protection to the ears, when compared to helmet flaps made from softer materials. A soft foam lining fitted to the outer cover to form a generous ear pocket achieves a superior, more comfortable fit, which is further enhanced by the hinging effect at the join between the ear protector and mating helmet contours, providing better accommodation for varying head shapes than a full helmet shell with ear coverage. The enclosure of the upper portion of the chinstrap inside the ear protector and the inventive locating tab added to the plastic outer cover, ensures the entire unit remains stable and secure when positioned over the ears.

Fitted to the outer plastic cover is an audio vent system that can be adjusted to a closed position to shut out the elements (wind, water, cold) or fully opened to allow increased audibility. A further inventive step in the design of these audio vents is a unique interlocking finger and slot connection system that provides a means for attachment of a speaker unit for a range of communications and music devices, and a connection facility for altimeters, cameras and the like. To the inventor's knowledge, the ability for connection of a range of equipment has never before been included in or associated with a helmet audio vent system.

The attachment of the new ear protector and audio system results in a complete head protection unit that has the stability and performance benefits of full shell helmet coverage, the detachable advantages of a helmet cut above the ears with ear flaps, improved comfort features and unique audio vents that enable the attachment of a range of devices.

The design features of the complete ear protector and audio system will be better understood when referring to the accompanying drawings.

1) PLASTIC OUTER COVER *(Refer Figures 1, 2 and 4)*
The plastic outer cover (1) is in the present form, but should not be limited to, a dome shape that is contoured to provide comfortable and secure ear coverage when attached to soft foam ear pocket (11)(12). The cover (1) has a central circular opening with locating grooves (3) to allow fitting of interlocking audio vent system (6)(10) and an upper locating tab (4) that fits between the helmet shell (16) and liner (15) to engage a hole (23) in the helmet shell liner (15) assisting connection of ear protector and audio system to the helmet and providing more stability to hold the system in position.

2) EAR POCKET *(Refer Figures 1 and 4)*
The ear pocket is made of soft foam or similar material (11)(12) designed to comfortably accommodate the ears. The pocket has an inner (11) and outer layer (12) forming an open ended sleeve (13) (14) allowing it to be slipped over the helmet buckle (19) and to slide freely along the chinstrap (17) (18) until it aligns with and sits snugly against the mating contours of the helmet shell (16) and liner (15).

3) AUDIO SYSTEM *(Refer Figures 2 and 3)*
This compromises three main components – audio vent main body (5), audio vent flange (9) and the speaker housing (20).

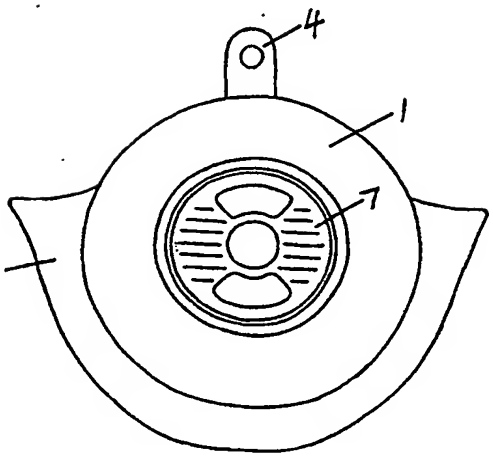
The main body (5) includes a connectable rotating grille (7) that allows the audio vent (8) to be open or closed. Protruding locking fingers (6) on the inside of the main body (5) provide the means for engaging the flange locking grooves (10), securing it into position. The flange (9) is inserted through the ear pocket opening (22) to sit snugly against the pocket outer layer (12), with locking grooves (10) protruding through the central opening of the outer layer (12). The plastic outer cover (1) is then fitted over the protruding flange locking grooves (10) aligning outer cover locating grooves (3) with flange locating lugs (2). The main body (5) is then fitted to the outside of the plastic outer cover (1) and the locking fingers (6) engage the flange locking grooves (10). The main body (5) is then rotated clockwise into the flange locked position (24), holding the ear pocket outer layer (12) and the plastic outer cover (1) firmly together.

The speaker housing (20) is designed to hold a speaker system for connection to one way or two way radio communications or for connection to a music system. It has the same locking finger connection arrangement (21) as the audio vent main body (6), so that it can engage with the audio vent inner flange (10).

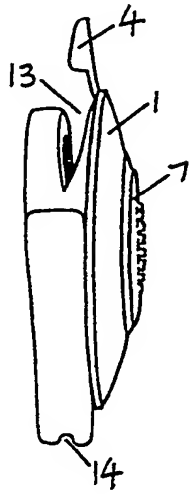
The main body (5), or the speaker housing (20), or any device fitted with locking fingers (6) made to the same specifications, or alternatively fitted to the main body (5) when locked into position with the flange (9) secures the plastic outer cover (1) and soft foam pocket (11)(12) and integrates all components as one unit.

FIGURE (1)

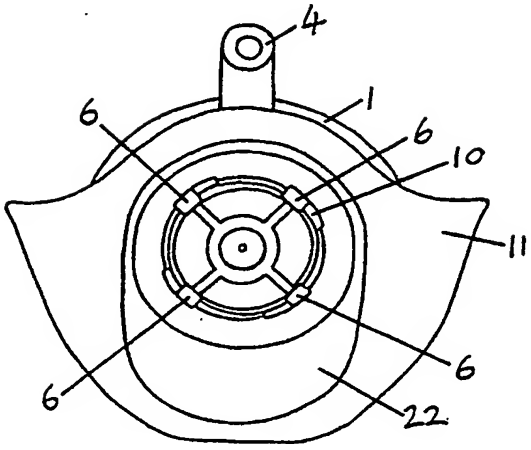
OUTSIDE VIEW

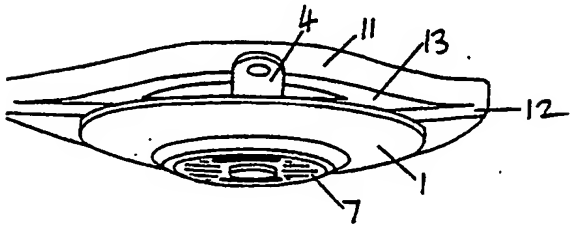


SIDE VIEW

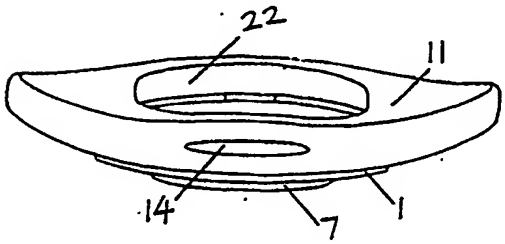


INSIDE VIEW





TOP VIEW



BOTTOM VIEW

FIGURE ②

EAR PROTECTOR & AUDIO VENT COMPONENTS

E. P. & A. V. ASSEMBLED

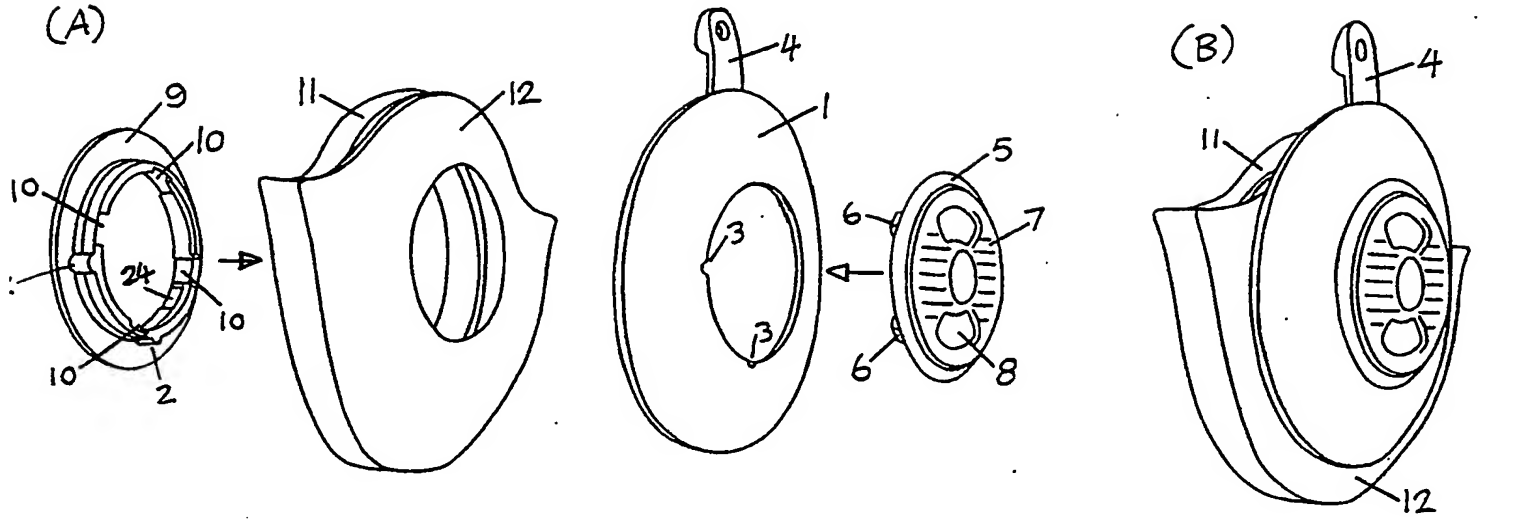
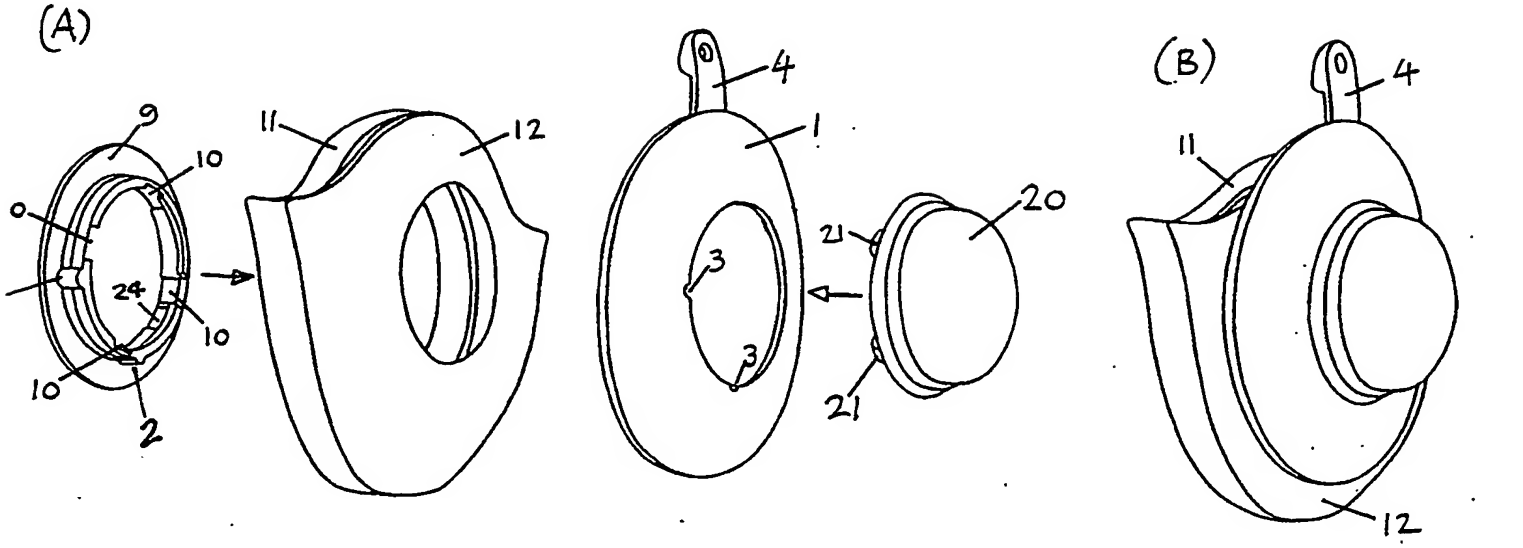


FIGURE ③

EAR PROTECTOR & SPEAKER HOUSING COMPONENTS

E. P. & S. H. ASSEMBLED



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